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Venture Capital Availability and Labor Market Performance in Industrial Countries: Evidence Based on Survey Data

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Venture Capital Availability and Labor Market Performance in Industrial Countries: Evidence Based on Survey Data

By Horst Feldmann

Abstract

This paper finds that more readily available venture capital is likely to have lowered unemployment rates and raised employment rates in industrial countries over the period 1982 to 2003. More readily available venture capital is also likely to have lowered the share of long-term unemployed in the total number of unemployed. The magnitude of the effects appears to have been substantial. To measure access to venture capital, we use answers from surveys of senior business executives. We also employ a large number of control variables. Our regression results are robust to variations in specification and sample size.

JEL classification: E24, E44, G24, J64

Keywords: employment, labor market, unemployment, venture capital

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I. INTRODUCTION

From the early 1980s, venture capital activity increased markedly in many industrial countries, culminating in an unprecedented boom in the second half of the 1990s (Gompers and Lerner 2001, Bottazzi and Da Rin 2002). However, there were also marked differences across countries. The magnitude of venture capital investment relative to GDP was above average in most Anglo-Saxon countries, such as the United Kingdom and the United States, and below average in many continental European countries, such as Germany and Italy (Jeng and Wells 2000). Similarly, labor market performance also improved markedly in most Anglo-Saxon countries since the early 1980s and was much better, on average, than in many continental European countries.

There are theoretical arguments suggesting that the availability of venture capital may have been an important determinant of industrial countries' labor market performance since the early 1980s. In particular, Acemoglu (2001) proposed a formal model in which differences in the ability of credit markets to provide loans to new firms are an important contributor to differences in labor market performance.[1] According to his model, in response to the arrival of new technologies, an economy with flexible credit markets will channel funds quickly and smoothly to new firms that take advantage of the new technologies, thus avoiding that the loss of jobs in firms adversely affected by the technological shock translates into a rise in unemployment. By contrast, in economies with rigid credit markets, agents who need to have cash to start up new businesses cannot borrow the necessary funds, leading to a persistent rise in unemployment.

Although Acemoglu (2001) focuses on the availability of loans, his argument also applies to the availability of venture capital. Indeed, according to the logic of his model, differences in the ability of economies to channel any type of external funds to new firms will lead to differences in labor market performance after the arrival of new technologies. As venture capital was an important form of external finance for new firms in many, especially Anglo-Saxon countries since the early 1980s and as this period was characterized by rapid technological and structural change, we hypothesize that more (less) readily available venture capital had a favorable (adverse) impact on labor market performance in industrial countries since the early 1980s.

1. Similarly, Wassmer and Weil (2004) provided a model that combines credit and labor market imperfections, showing that the former tend to increase unemployment.

So far there are only few empirical studies analyzing the impact of venture capital on labor market performance. Almost all of them take a microeconometric approach. The only macroeconometric papers are by Belke et al. (2004, 2005, 2006). Using data on 20 industrial countries for the period 1986 to 1999 and applying a GMM difference estimator, they find that venture capital investment tends to reduce unemployment and to raise employment. Analyzing the effects of the largest U.S. government initiative to support high-technology firms (the Small Business Innovation Research program), Lerner (1999) finds that, between 1983 and 1995, program awardees achieved substantially greater employment growth and were significantly more likely to attract venture financing than similar firms not assisted by the program. Engel and Keilbach (2007) used a large database that comprises virtually all firms registered in the German trade register and applied matching procedures to compare venture-funded firms with non-venture-funded matched firms. They find that employment growth in the former was roughly twice as large as in their non-venture-funded counterparts. By contrast, using data for the years 1996 to 2000 on 511 companies listed on Europe's 'new' stock markets, Bottazzi and Da Rin (2002) do not find any effect of venture capital on employment growth in the period of (up to) three years after the IPO.

Using a sample of 20 industrial countries, this paper analyzes empirically how the availability of venture capital affected the performance of the labor market in the period 1982 to 2003. It goes beyond previous papers in four ways. Our major innovation is that we use an indicator of access to venture capital that has not been used previously. It is based on surveys of senior business executives. By contrast, all previous papers use hard data. For example, Belke et al. (2004, 2005, 2006) use venture capital financed investment relative to GDP, conceding that this is only a rough measure for the functioning of the venture capital market. As explained in the next section, our survey-based indicator is likely to better capture the availability of venture capital in the economy. Thus it may help to shed useful new light on the labor market effects of venture capital.

Second, we estimate the effects not only on unemployment and employment rates but also on the share of long-term unemployed in the total number of unemployed. Third, compared with previous cross-country panel studies, we use a much larger set of control variables. Specifically, we are the first to control for all major labor market institutions, product market regulation as well as stock market activity and lending by financial intermediaries. Finally, our paper is the first to fully cover the most recent venture capital boom, including several subsequent years. The latter point is important since, as Belke et al. (2004, p. 16) observe, it takes time for venture capital investments to fully realize their employment potential.

Our paper is structured as follows. Section II describes the data and the estimation method. Section III presents and discusses the regression results. Section IV concludes.

II. DATA AND METHODOLOGY

2.1. Data on Venture Capital Availability

To measure access to venture capital, this paper uses results from the World Economic Forum's annual *Executive Opinion Surveys* (EOS). The respondents were CEOs or other members of companies' senior management. In each country approximately 50 executives were questioned. The industry structure of the companies questioned corresponded largely to the industry structure of the relevant economy (excluding the agricultural sector). Also, care was taken to question companies of various size categories and types (e.g., private and state-owned, domestically oriented and internationally active enterprises).[2]

The typical EOS question asks participants to indicate on a numerical scale to what extent they agree or disagree with a specific statement. After the questioning, country-level average scores were calculated for each question. Table A1 contains the questions on venture capital availability used in the *Executive Opinion Surveys*. As the World Economic Forum applied different scales in the years before 1997, we convert all pre-1997 scores to the 1-to-7 scale applied in the more recent surveys. To avoid small absolute values for the regression coefficients, we additionally divide the national EOS scores by 10. As can be seen from Table A1, there are no survey questions from 1985, 1988 and 1991. While the World Economic Forum did not conduct a survey in 1985 and 1988, the 1991 survey did not include a question on venture capital availability. As can also be seen from the table, all questions are phrased in a similar way. There are some slight variations but these are only refinements of style to make the questions more precise. Thus the responses to all questions can be used simultaneously.

There are several reasons to assume that the answers of the *Executive Opinion Surveys* correctly reflect the availability of venture capital. First, the selection of respondents is largely representative and they have comprehensive knowledge of and often practical experience with the venture capital

2. Over time, there have been some changes to the World Economic Forum's surveys that are of minor importance to our analysis. First, between 1989 and 1995 the surveys were conducted in collaboration with the Institute for Management Development, Lausanne, and between 1996 and 2001 in collaboration with the Center for International Development at Harvard University. Second, the average number of respondents per country increased steadily from 32 in 1982 to 59 in 2002. Third, the number of countries covered also increased steadily, from 22 in 1982 to 80 in 2002.

industry of their countries of residence. Second, the questions are phrased objectively and permit better coverage of the various facets of venture capital financing than hard data. Venture capital financing is not limited to a one-off investment in a firm. Rather, it typically goes through various stages (Gompers and Lerner 2001, Bottazzi and Da Rin 2002): a small initial investment that allows an entrepreneur to verify whether the project is feasible ('seed finance'); an investment to operationalize a new firm ('start-up finance'); an investment to expand production ('expansion finance'); and an investment to help the firm become a market leader, preparing it for trade sale or IPO ('later stage finance'). At each stage, venture capitalists usually provide firms with expert advice, a network of contacts and stringent incentives to perform. In answering the EOS questions, the respondents are likely to have taken all of these facets into account, including the so-called soft side of venture capital. By contrast, the ratio of venture capital financed investment to GDP is a more narrow measure. Another drawback of the hard data used in previous studies is that, for two reasons, they may be imprecise. First, in contrast to most official international data they are not fully harmonized across countries as they come from various private sector sources (such as Venture Economics and the European Private Equity and Venture Capital Association). Second, as venture capital financing is not recorded officially and is often small-scale, especially in its early stages, a substantial part of it may have gone unrecorded.

Potential drawbacks also have to be considered in connection with the use of the EOS:

– One cause for concern is that each respondent may use his own yardstick when answering the questions. However, in the planning, implementation and analysis of the surveys, care was taken to ensure the use of a uniform yardstick. For one, the respondents were provided with a written explanation of the answering scale.[3] Also, the answers were examined for robustness and consistency using various methods. In one of these checks, half of the answers from each country were randomly dropped from the sample. As the national EOS scores remained stable, they have obviously not been distorted by individual peculiarities in responding (e.g., Blanke et al. 2003, pp. 372-375).
– Another potential drawback is that the answers may be distorted by the state of the business cycle prevailing at the time of the questioning. For example, some respondents may answer more positive in a favorable business climate. However, the problem of potential cyclical distortion of the answers is unlikely to play an important role for three reasons. First, as mentioned previously, the national EOS scores remained stable when the World Economic Forum's researchers randomly dropped from the sample half of the answers from each country.

3. Blanke et al. (2003, p. 370) quote an example of the written explanation of the answering scale. It does not refer to a question on venture capital availability though, but to a question on the level of sophistication of financial markets.

Second, the correlation coefficient between our 'venture capital availability' variable and the 'output gap' variable, at 0.33, is small (Table A2). Third, we statistically control for the impact of the business cycle (section 2.2).

– There may be further reasons why the national EOS scores may not accurately reflect cross-country differences in the availability of venture capital. For instance, respondents in a country may have a similarly biased assessment of the availability of venture capital if this topic has recently been discussed extensively and with a certain flavor in the press. Also, the questions may be interpreted differently in different countries. The authors of the Executive Opinion Surveys tried to avoid this problem by providing all respondents with a written explanation of the answering scale and by asking them to think in world terms rather than in national terms.[4]

As the national EOS scores may be biased, we check whether they are supported by related objective data. Specifically, we compare them with the indicator 'venture capital investment as per mil of average GDP'. Data on this indicator are available for all of our 20 countries for the years 1986 to 1995 (Jeng and Wells 2000, p. 249). The correlation coefficient between this indicator and the corresponding EFW variable is 0.29. Therefore, in general, with an increasing ratio of venture capital investment to GDP more respondents thought that venture capital was readily available. Although the objective data thus tend to support the survey data, the size of the correlation coefficient is small. This does not necessarily mean that the national EOS scores are biased. Instead, for the reasons given above, they may actually be better suited to capture access to venture capital. To be sure, as pointed out previously, they have certain limitations. However, as also pointed out previously, objective measures have shortcomings of their own. The judgments of high-level business executives, as recorded in the EOS, provide an alternative characterization that may shed useful new light on the effects of venture capital availability. This paper thus complements previous studies of other researchers who have exclusively used objective measures.

4. It is possible that some respondents were not properly aware of venture capital availability in other countries. However, many respondents were from large and/or foreign-owned companies (see, e.g., Blanke et al. 2003, pp. 370-372) and were thus certainly able to think globally. Furthermore, as mentioned previously, the national EOS scores remained stable when the World Economic Forum's researchers randomly dropped from the sample half of the answers from each country. Both facts suggest that limited ability to think in world terms, which may have been a problem for some respondents from small companies, is unlikely to have biased the national EOS scores.

2.2. Control Variables

To avoid omitted variables bias, we control for the impact of all other major factors that may affect labor market outcomes. As this is another major innovation of our paper, this section explains the rationale for each of our control variables in some detail (for definitions, sources and descriptive statistics, see Table A1).

We use several control variables to ensure that our 'venture capital availability' variable does not proxy for the financial system as a whole. Specifically, in our baseline specifications we apply two measures of the activity of the financial system: 'private credit' and 'stock market total value traded'. 'Private credit' equals the value of credits by financial intermediaries to the private sector divided by GDP. This variable measures one of the main activities of financial intermediaries: providing loans. We also control for stock market activity, using the value of shares traded on domestic stock markets divided by GDP. In one of our robustness checks, we employ measures of the financial sector's size, rather than of its activity: 'financial system deposits' and 'stock market capitalization'. The former equals demand, time and savings deposits in financial institutions as a share of GDP. The latter equals the value of shares listed on domestic stock markets divided by GDP.

Our next controls, 'trade union density', 'collective bargaining coverage' and 'wage bargaining centralization or coordination', cover the three most important characteristics of the wage bargaining system. Trade unions are likely to wield substantial bargaining power if a large share of workers are union members. Their power will be strengthened further if employers apply the terms of union-negotiated contracts to their non-union workforce, either voluntarily or because a legal or administrative extension makes a collective agreement generally binding. Monopoly models of unions suggest that powerful trade unions will attempt to set aggregate wages at a level that is too high relative to overall productivity, raising equilibrium unemployment and lowering equilibrium employment (for a survey, see Aidt and Tzannatos 2002). Additionally, for equity reasons unions usually bargain for above-average increases in the bottom range of the wage distribution. The resulting reduction in wage dispersion will also lead to an increase in unemployment and a fall in employment, particularly in low-productivity regions and among low-skilled workers. While previous empirical studies have not yet come up with conclusive evidence for the effects of collective bargaining coverage, many of them find higher union density to be associated with higher

unemployment (e.g., Scarpetta 1996, Blanchard and Wolfers 2000, IMF 2003, Baccaro and Rei 2007).

Bruno and Sachs (1985) and Soskice (1990) argue that a high degree of wage bargaining centralization or coordination facilitates implicit or explicit 'social pacts' under which trade unions agree to restrain wage demands in exchange for policy concessions from the government, leading to comparatively low unemployment and high employment. Indeed, many previous empirical studies find a high degree of centralization or coordination to be associated with comparatively low unemployment rates (e.g., Nickell et al. 2005, Bassanini and Duval 2006).

We control for the impact of labor taxes using the 'tax wedge' variable. From a theoretical point of view, labor taxes reduce employment since they raise employers' wage cost and lower workers' net wages (Boeri and van Ours 2008). Most previous empirical studies find a high tax burden on labor to adversely affect labor market performance (e.g., Daveri and Tabellini 2000, Prescott 2004).

In one of our robustness checks, we substitute labor and consumption tax rates for the tax wedge. While the former are derived from National Accounts, reflecting all the factors that influence the amount of taxes actually paid in a country, the latter is based on calculations for a typical family, taking into account personal income taxes, social security contributions and family benefits. As the tax wedge provides a more precise picture of how tax and benefit policies affect both individuals' work incentives and employers' incentives to employ workers, we use this measure in our baseline specifications.

We also control for the impact of employment protection legislation. Theory predicts that stricter employment protection legislation leads firms to reduce both dismissal and hiring rates, increasing the length of unemployment spells. The net effects on unemployment and employment rates are ambiguous though (e.g., Bertola 1990). Most empirical studies find a positive effect on the share of long-term unemployed in the total number of unemployed but no robust evidence for a significant effect on unemployment or employment rates (e.g., Scarpetta 1996, OECD 2004a, Nickell et al. 2005, Bassanini and Duval 2006, Baccaro and Rei 2007).[5]

In one robustness check, we split the employment protection legislation variable, which covers both regular and temporary contracts, into its two components, i.e., a variable measuring the stringency

5. By contrast, using EOS rather than hard data to measure the strictness of hiring and firing regulation, Feldmann (2009) finds stricter regulation to be correlated with both higher unemployment and lower employment rates.

of employment protection legislation for regular contracts and another measuring the stringency of employment protection legislation for temporary contracts. The underlying idea is that strict regulation of regular contracts is more likely to adversely affect labor market performance than strict regulation of temporary contracts and, therefore, that the coefficient on the aggregate 'employment protection legislation' variable may mask the effect of the former.

Furthermore, we control for the impact of unemployment benefit schemes. Many empirical studies find that generous unemployment benefits tend to raise unemployment (e.g., Scarpetta 1996, Elmeskov et al. 1998, Bertola et al. 2002, Nickell et al. 2005, Bassanini and Duval 2006). These studies corroborate standard labor economics theory, according to which such benefits reduce the job-search intensity of the unemployed and their willingness to accept job offers. By lowering the economic cost of unemployment, they may also put upward pressure on workers' wage claims, further increasing unemployment and lowering employment. On the other hand, one may argue that generous unemployment benefits may lower unemployment and raise employment by encouraging workers to look for more suitable jobs, thus reducing the likelihood of subsequent job separations.[6]

In another robustness check, we split the 'unemployment benefits replacement rate' variable into two components: the unemployment benefits replacement rate during the first year of unemployment and the duration of unemployment benefits. The reason is that the aggregate unemployment benefits replacement rate may mask two opposite effects. Whereas a generous initial unemployment benefits replacement rate may improve labor market performance by encouraging workers to look for more suitable jobs, thus lowering the likelihood of subsequent job separations, a long duration of unemployment benefits may reduce job-search intensity of the unemployed and their willingness to accept job offers, thus deteriorating labor market performance. It should be noted though that a generous initial unemployment benefits replacement rate may also exert these adverse incentive effects; thus its overall impact on labor market performance is ambiguous from a theoretical point of view.

Additionally, we control for the impact of product market regulation. Theoretical studies argue that anticompetitive product market regulations (e.g., entry restrictions, price controls) will generally reduce equilibrium output and thus labor demand and employment, increasing unemployment (e.g., Blanchard and Giavazzi 2003, Pissarides 2003). According to these studies, they lead to fewer

6. Acemoglu and Shimer (2000) and Chetty (2008), among others, argue that generous unemployment benefits allow workers to find better matches. They do not, however, argue that this leads to lower unemployment or higher employment.

entries of new firms, lower competitive pressures and more inefficiencies. Furthermore, the lack of competition increases the price mark-up that firms are able to enforce. Insofar as employees are able to appropriate part of these rents via wage premia, firms will produce more capital intensive and less labor intensive than in a competitive situation. This will cause employment to fall and unemployment to rise even further. Indeed, several empirical studies find that anti-competitive product market regulation is likely to adversely affect labor market performance (e.g., Nicoletti and Scarpetta 2005, Bassanini and Duval 2006).

We use the output gap to control for the state of the business cycle. In one robustness check, we replace this variable by three variables capturing more directly macroeconomic shocks. We employ the 'total factor productivity shock' variable since, in the presence of lagged wage adjustment to productivity growth, positive (negative) productivity surprises should induce a temporary decrease (increase) in unemployment as well as a temporary increase (decrease) in employment (e.g., Ball and Moffitt 2002). We employ the 'terms of trade shock' variable since a rise in relative import prices could increase wage pressure and thus unemployment, lowering employment (e.g., Layard et al. 2005). We employ the 'interest rate shock' variable since a rise in the real interest rate is likely to lower investment and labor demand, thereby increasing unemployment and lowering employment (Blanchard and Wolfers 2000).

In a further robustness check, we additionally control for the level of economic development using the variable 'GDP per capita'. Although it seems likely that employment rates are systematically related to the level of economic development, we do not include the respective variable in our baseline specifications as it is normally not included in cross-country regressions that focus on industrial countries.

In another robustness check, we additionally control for the impact of active labor market policies (such as job placement services, vocational training, hiring subsidies, public employment schemes). Properly designed active labor market policies can reduce unemployment and raise employment by improving the job matching process and by enhancing the work experience and skills of the unemployed. Cross-country panel studies generally find a negative correlation between spending on active labor market policies and unemployment (e.g., Scarpetta 1996, Elmeskov et al. 1998). However, a large number of microeconometric evaluation studies suggest that the effectiveness of active labor market policies varies widely across different types of programs (e.g., Kluve et al. 2007). For example, public employment programs reduce official unemployment figures but often

fail to bring the unemployed back into unsubsidized work. We do not include the variable 'active labor market policies' in our baseline specifications since it is usually not considered in cross-country labor market studies.

In a further robustness check, we additionally control for the impact of central bank independence. Several researchers argue that central bank independence could affect the level of unemployment. As most of them argue, and since previous empirical studies indicate, that this effect depends on the degree of wage bargaining centralization or coordination (e.g., Iversen 1998, Hall and Franzese 1998), we also employ an interaction between 'central bank independence' and 'wage bargaining centralization or coordination' in the respective robustness check.

2.3. Dependent Variables, Sample and Estimation Method

To measure the effects on the labor market, this paper uses both the unemployment and the employment rate. The unemployment rate is the most important and best-known labor market measure. However, it may be insufficient to measure labor market slack since in some industrial countries, governments try to hide the true extent of unemployment by offering unemployed workers generous disability or early retirement benefits. Therefore, we additionally use the employment rate. Furthermore, we estimate the effect on the percentage share of long-term unemployed in the total number of unemployed; a large share of long-term unemployment indicates that the labor market operates inefficiently.

Our sample of 20 industrial countries includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. The sample period is limited to the years 1982 to 2003 as data on some labor market institutions and product market regulation are unavailable for earlier or more recent years.

In our baseline specifications, we estimate the following model:

$$Y_{i,t} = \beta_1 V_{i,t-1} + \beta_2 C_{i,t-1} + \beta_3 S_{i,t-1} + \beta_4 \mathbf{L}_{i,t-1} + \beta_5 P_{i,t-1} + \beta_6 O_{i,t} + \alpha_i + \lambda_t + \varepsilon_{i,t},$$

where $Y_{i,t}$ is a labor market performance variable of country i at year t, $V_{i,t-1}$ is our 'venture capital availability' variable, $C_{i,t-1}$ denotes the 'private credit' variable, $S_{i,t-1}$ is the variable 'stock market total value traded', $\boldsymbol{L}_{i,t-1}$ denotes a vector of labor market institutions variables, $P_{i,t-1}$ is our 'product market regulation' variable, $O_{i,t}$ is the output gap, while α_i and λ_t are country and year fixed effects, respectively, and $\varepsilon_{i,t}$ is the error term.

Most explanatory variables are lagged by one year to lessen concerns about possible simultaneity bias and to allow for slow adjustment. For example, changes in the availability of venture capital are likely to affect labor market performance only after some time. The same can be expected from changes in credits, stock market activity, labor market institutions and product market regulation.

Country effects are included to control for the impact of unobserved country-specific characteristics, e.g., cultural norms concerning female labor force participation. Year effects are included to control for the impact of shocks that are common across countries, e.g., oil price shocks. The inclusion of both country and year effects is likely to be sufficient to control for the impact of most of the relevant omitted variables.

As there are no suitable instruments to address potential endogeneity, the regression analysis presented below does not establish causality. Instead, the regressions are used to measure conditional correlations, i.e., to assess whether our 'venture capital availability' variable is statistically significant after controlling for other relevant factors. Still, the estimates for our variable of interest are likely to be causal for four reasons. First, we control for all major determinants of labor market performance that have been found in the previous literature. Second, we additionally control for the impact of the financial system. Third, we also control for unobserved country and year effects. Fourth, our variable of interest enters the equation with a one-year time lag.

As the correlation matrix illustrates, there is no substantial correlation among any pair of explanatory variables used in our baseline specifications (Table A2). However, the 'collective bargaining coverage' variable is moderately correlated with the variables 'tax wedge', 'employment protection legislation' and 'unemployment benefits replacement rate'. Additionally, the 'employment protection legislation' variable is moderately correlated with both the 'tax wedge' and the 'product market regulation' variable. To check whether jointly including these variables affects the estimates for our variable of interest, we drop the former variables one at a time in some of our

sensitivity checks. As it turns out, the estimates for our variable of interest are unaffected (results not reported here).

III. RESULTS

Table 1 presents our main results. Each estimate for the 'venture capital availability' variable is statistically significant. According to our results, more readily available venture capital is associated with a lower unemployment rate, a smaller share of long-term unemployment and a higher employment rate.

Our regression results suggest that venture capital availability had substantial effects on labor market performance. For example, take the United States. On the 1-to-7 scale, its EOS score increased from 5.06 on average over the years 1982 and 1983 to 6.37 on average over the years 1999 and 2000 (the peak of the venture capital boom). Over the same period, the performance of the U.S. labor market also improved markedly, according to each of our three dependent variables. Our estimates suggest that the greater availability of venture capital might have caused a fall in the unemployment rate from the earlier to the later years of 0.9 percentage points, ceteris paribus. They also suggest that the greater availability of venture capital might have caused a drop in long-term unemployment of 4.4 percentage points, ceteris paribus. Furthermore, it might have contributed to a rise in the employment rate of 1.3 percentage points, ceteris paribus.

Comparing two countries also suggests that differences in the availability of venture capital might have had substantial effects on labor market outcomes. In our sample of 20 countries, venture capital was most readily available in the United States. By contrast, in Italy it was most difficult to obtain. On the 1-to-7 scale, the United States' EOS score averaged 5.83 whereas Italy's averaged 3.15 during our sample period. Italy also had much higher unemployment rates, much larger long-term unemployment shares and much lower employment rates. On average over the years 1983 to 2003, its unemployment rate was 9.6%, its long-term unemployment share 63.3% and its employment rate 52.8%. The corresponding figures for the United States are an unemployment rate of 5.9%, a long-term unemployment share of 9.0% and an employment rate of 71.6%.[7] According to our estimates, if venture capital had been as readily available in Italy as in the United States,

7. To calculate the averages for the labor market performance variables, we exclude data for the years 1982, 1986, 1989 and 1992 since there are no EOS data for the years 1985, 1988 and 1991 and since we lag the 'venture capital availability' variable by one year in our regressions.

Italy's unemployment rate might have been 1.8 percentage points lower, its long-term unemployment share 9.0 percentage points lower and its employment rate 2.7 percentage points higher, ceteris paribus. Of course, these figures (as the ones in the previous paragraph) should be taken with a grain of salt. Still, they illustrate that the magnitude of the effects is likely to have been substantial. The latter is in stark contrast to the results for the control variables, most of which are statistically insignificant.

As indicated previously, we conduct a wide array of robustness checks (Tables A3 to A6).[8] In our first check, we substitute measures of size of the financial sector for measures of its activity. In our second check, we exchange the 'tax wedge' variable for the two other tax variables mentioned in section 2.2. In a third check, we split employment protection legislation into its two components, while in a fourth check, we split up the 'unemployment benefits replacement rate' variable. In our fifth check, we substitute our three variables measuring macroeconomic shocks for the 'output gap' variable. In our sixth and seventh check, we add the variables 'GDP per capita' and 'active labor market policies', respectively. In our eighth check, we additionally control for the impact of central bank independence. In our final robustness check, we drop one country from our sample at a time and re-estimate the baseline specifications at each step – the purpose being to investigate the possibility that a particular country might significantly affect the estimated parameters in our small country sample. In all of these checks, the coefficient on our variable of interest is statistically significant. In most cases, the size of the coefficient is very similar to the result from the respective baseline regression. This is also the case when the United States is excluded from the sample.

This paper's results corroborate the theoretical arguments suggesting that access to venture capital may have been an important determinant of industrial countries' labor market performance since the early 1980s (section I). In particular, they corroborate Acemoglu's (2001) model according to which a better ability of an economy to channel external funds to new firms will lead to comparatively lower unemployment in the presence of a technological shock.

Furthermore, our results are in line with most previous empirical studies on the employment effects of venture capital (section I). In particular, they are in line with Belke et al.'s (2004, 2005, 2006) macroeconometric studies, which use the same sample of countries but a different methodology,

8. Unless otherwise noted (see the top of Tables A3 to A5), each robustness check includes the same control variables as the baseline specifications (Table 1), i.e., 'private credit', 'stock market total value traded', 'trade union density', 'collective bargaining coverage', 'wage bargaining centralization or coordination', 'tax wedge', 'employment protection legislation', 'unemployment benefits replacement rate', 'product market regulation' and 'output gap'. The respective estimates are not shown in Tables A3 to A6 to save space.

fewer control variables and a shorter sample period. Our results are also consistent with most microeconometric studies finding that venture-funded firms experience higher employment growth than similar non-venture-funded firms.

Additionally, our results are consistent with previous empirical studies analyzing the effects of venture capital activity on innovation and bank lending in the United States. For example, using data on 20 manufacturing industries for the period 1965 to 1992, Kortum and Lerner (2000) find that venture funding increased patented inventions. Ueda and Hirukawa (2008) recently confirmed that this positive impact continued to be present and became even stronger during the venture capital boom of the late 1990s. Similarly, using data on 149 Silicon Valley high-technology start-ups from the period 1994 to 1997, Hellmann and Puri (2000) find that innovator firms were more likely to obtain venture capital than imitator firms. According to their results, venture capital was also associated with a significant reduction in the time to bring a product to market, especially for innovators. Using data on 10,578 companies over 1980 to 2000, Hellmann et al. (2008) find that having had a prior relationship with a company in the venture capital market increased a bank's likelihood of subsequently granting a loan to that company, and that the relevant companies benefited from this relationship not only through more readily available loans but also through more favorable loan pricing. The results from these studies suggest potentially important transmission mechanisms from venture capital availability to labor market performance. By stimulating invention and innovation, venture capital is likely to improve the international competitiveness of the relevant economy, raising the rate of long-term economic growth and possibly inducing higher foreign direct investment inflows. Increased availability and lower cost of bank loans for venture-backed firms is likely to underpin these positive effects. It is important to realize that other firms are also likely to benefit, for example, as suppliers to thriving venture-backed companies or as customers who upgrade their products or production processes by using goods or services invented by venture-backed firms. Even non-venture backed firms that are neither suppliers nor customers of venture-backed companies will benefit from the increase in the long-term growth rate of the overall economy. All of this is likely to increase labor demand, thus raising employment and lowering unemployment.

Finally, let us briefly comment on our estimates for the control variables:

– In line with theory and most previous empirical research (section 2.2), we find a higher tax wedge to be correlated with both a higher unemployment rate and a larger long-term unemployment share (Table 1). Re-estimating the baseline equations using the National

Accounts measures yields similar results. Specifically, a higher labor tax rate is associated with a higher unemployment rate, a larger long-term unemployment share and a lower employment rate (Tables A3 to A5).

- A high degree of wage bargaining centralization or coordination is correlated with a smaller share of long-term unemployment (Table 1), suggesting that it may speed up reintegration of unemployed workers.
- In line with most previous empirical studies (section 2.2), we find no evidence for an effect of aggregate employment protection legislation on either the unemployment or the employment rate (Table 1). Surprisingly, we find no effect on long-term unemployment either. Re-estimating the baseline regressions using the two components of employment protection legislation suggests that stricter protection for regular contracts may raise the unemployment rate (Table A3). This result lends some support to our conjecture that the aggregate measure may mask the effect of restrictions on regular contracts.
- The coefficient on 'output gap' is statistically significant both in the regression to explain the unemployment rate and in the regression to explain the employment rate (Table 1), highlighting the importance of cyclical conditions for labor market performance. Substituting our macroeconomic shock variables for the output gap indicates that while terms of trade shocks adversely affect each of our dependent variables, interest rate shocks adversely affect long-term unemployment and employment only (Tables A3 to A5). Positive total factor productivity shocks are associated with a lower unemployment rate but also with a larger share of long-term unemployment (Tables A3 and A4).
- Higher GDP per capita is correlated with a lower unemployment rate, a smaller share of long-term unemployment as well as a higher employment rate (Tables A3 to A5), suggesting that richer countries may be better able to integrate workers into the job market.
- Higher per capita expenditure on active labor market policies is also correlated with a lower unemployment rate, a smaller long-term unemployment share and a higher employment rate (Tables A3 to A5). While this indicates that, in general, these policies appear to succeed in 'activating' unemployed and economically inactive persons, the results from microeconometric studies on the effectiveness of active labor market policies suggest that our result (as well as the results from previous cross-country panel studies) should be interpreted with some caution (section 2.2).
- Finally, we find a higher degree of central bank independence to be associated with a lower unemployment rate and that this effect is independent of the degree of wage bargaining centralization or coordination (Table A3).

IV. CONCLUSION

Our regression results indicate that more readily available venture capital is likely to have improved industrial countries' labor market performance over the period 1982 to 2003. The magnitude of the effects appears to have been substantial. While our results are broadly similar to previous empirical studies, this paper goes beyond these studies in several respects. It is the first to use survey data to measure the availability of venture capital, the first to fully cover the most recent venture capital boom and the first to estimate the effects on long-term unemployment. We also use a much larger set of control variables than previous macroeconometric papers.

As mentioned in section 2.3, the evidence provided in this paper corresponds to conditional correlations in the data. It does not establish causality. Still, the fact that, in all cases, more readily available venture capital is correlated with better labor market performance in the following year, even after controlling for many factors, is intriguing and suggests that the effect is likely to be causal.

Although the coefficient on our 'venture capital availability' variable is very robust and although our results are consistent with most previous studies, more research is clearly warranted. In particular, the transmission channels from venture capital availability to labor market performance need to be more closely analyzed, both theoretically and empirically. The policy implications of our findings (and the policy implications of other researchers' findings) need to be thoroughly discussed as well. For example, should government intervene directly in the venture capital market by, e.g., subsidizing funding of the most promising start-ups or should it confine itself to improving the institutional environment for start-ups and venture capitalists by, e.g., strengthening patent rights, liberalizing business regulation and increasing the rewards of successful risk-taking via the tax system?

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Table 1. Regressions to explain labor market performance – baseline specifications[a)]

	(1)	(2)	(3)
	Unemployment rate	Long-term unemployment	Employment rate
Venture capital availability	-6.88** (2.47)	-33.48** (11.95)	10.21** (4.14)
Private credit	-0.06 (0.34)	2.48 (3.27)	0.44 (0.79)
Stock market total value traded	-0.39 (0.54)	2.79 (2.07)	0.13 (0.94)
Trade union density	6.74 (6.97)	1.67 (37.54)	2.19 (11.22)
Collective bargaining coverage	-0.90 (1.65)	3.00 (6.49)	-1.84 (2.35)
Wage bargaining centralization or coordination	-0.01 (0.97)	-6.78*** (2.28)	0.07 (0.88)
Tax wedge	12.06** (4.91)	97.77*** (21.79)	-15.10 (9.62)
Employment protection legislation	-3.13 (8.31)	-35.13 (36.32)	12.58 (15.66)
Unemployment benefits replacement rate	1.93 (5.34)	17.35 (21.15)	2.81 (9.64)
Product market regulation	1.60 (5.05)	20.98 (26.12)	-10.32 (12.16)
Output gap	-0.45*** (0.07)	-0.43 (0.28)	0.36*** (0.11)
Number of observations	250	246	249
R^2	0.74	0.52	0.60
Standard error of regression	1.00	4.65	1.62

[a)]Pooled least squares estimates with country-specific and year-specific fixed effects. The sample consists of 20 industrial countries. The sample period is 1982 to 2003. Except for the 'output gap' variable, all explanatory variables are lagged by one year. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Table A1. List of variables

	Definition	Mean	Std. Dev.	Min.	Max.	Source
Active labor market policies	Public expenditure on active labor market programs per unemployed worker as a share of GDP per capita	0.29	0.25	0.03	1.79	Bassanini and Duval (2006)
Central bank independence	The index ranges from 0 to 1 with higher values representing more independence. It assesses both the legal status of the central bank and its reputation for independence	0.59	0.25	0.15	0.93	Franzese (1999), IMF (2003), author's estimates
Collective bargaining coverage	Dummy variable that takes the value one when collective bargaining coverage exceeds 50% and zero otherwise	0.72	0.45	0.00	1.00	Bassanini and Duval (2006)
Consumption tax rate	Total amount of consumption tax paid in a country as a share of total consumption. The consumption tax rate is derived from National Accounts	0.17	0.06	0.06	0.29	Bassanini and Duval (2006)
Employment protection legislation	Indicator of the stringency of employment protection legislation. Unweighted average of measures for regular and temporary contracts. The ratings are scaled to range from 0 (least restrictive) to 0.6 (most restrictive)	0.21	0.11	0.02	0.42	OECD (2004a)
Employment protection legislation regular contracts	Indicator of the stringency of employment protection legislation for regular contracts. The ratings are scaled to range from 0 (least restrictive) to 0.6 (most restrictive)	0.21	0.10	0.02	0.50	OECD (2004a)
Employment protection legislation temporary contracts	Indicator of the stringency of employment protection legislation for temporary contracts. The ratings are scaled to range from 0 (least restrictive) to 0.6 (most restrictive)	0.21	0.15	0.03	0.54	OECD (2004a)
Employment rate	Employed aged 15 to 64 years as a percentage of the population in the same age bracket	65.95	8.11	46.20	83.10	OECD (2007)
Financial system deposits	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP. Deposit money banks comprise all financial institutions (excluding the central bank) that have liabilities in the form of deposits usable as means of payment. Other financial institutions comprise financial intermediaries that do not incur liabilities usable in making payments	0.74	0.37	0.29	2.30	Beck and Al-Hussainy (2007)
GDP per capita	Gross domestic product per capita, in thousands of constant 2000 international dollars, converted at purchasing power parity rates	23.23	4.79	10.32	35.41	World Bank (2007)

Table A1. List of variables (cont.)

	Definition	Mean	Std. Dev.	Min.	Max.	Source
Initial unemployment benefits replacement rate	Gross unemployment benefits during the first year of unemployment as a share of previous gross wage earnings. Averages across two income situations (100% and 67% of average production worker earnings) and three family situations (single, with dependent spouse, with spouse in work)	0.48	0.20	0.01	0.89	OECD (various issues, a)
Interest rate shock	Difference between 10-year nominal government bond yield (in %) and annual change in the GDP deflator (in %)	4.52	2.21	-9.28	11.20	Bassanini and Duval (2006)
Labor tax rate	Total amount of tax paid on labor earnings in a country as a share of total labor costs. The labor tax rate is derived from National Accounts	0.27	0.06	0.17	0.42	Bassanini and Duval (2006)
Long-term unemployment	Persons unemployed for 12 months or more as a percentage of total unemployed	33.88	17.68	3.00	76.20	European Commission (2006), OECD (2007)
Output gap	The gap between actual and potential output as a percentage of potential output	-0.87	2.47	-12.21	4.51	OECD (2004b)
Private credit	The value of credits by deposit money banks and other financial institutions to the private sector as a share of GDP. Deposit money banks comprise all financial institutions (excluding the central bank) that have liabilities in the form of deposits usable as means of payment. Other financial institutions comprise financial intermediaries that do not incur liabilities usable in making payments	0.92	0.44	0.22	3.45	Beck and Al-Hussainy (2007)
Product market regulation	Indicator of regulatory impediments to product market competition in the following seven non-manufacturing industries: gas, electricity, post, telecoms (mobile and fixed services), passenger air transport, railways (passenger and freight services) and road freight. The ratings are scaled to range from 0 (least restrictive) to 0.6 (most restrictive)	0.38	0.13	0.11	0.60	Conway et al. (2006)
Stock market capitalization	The value of shares listed on domestic stock markets divided by GDP	0.67	0.51	0.00	3.03	Beck and Al-Hussainy (2007)
Stock market total value traded	The value of shares traded on domestic stock markets divided by GDP	0.46	0.55	0.00	3.26	Beck and Al-Hussainy (2007)
Tax wedge	Sum of personal income tax plus employee's and employer's social security contributions less cash benefits as a share of total labor cost for an employee earning the average production worker wage; single-earner couple with two children	0.29	0.09	0.09	0.46	OECD (various issues, b)

Table A1. List of variables (cont.)

	Definition	Mean	Std. Dev.	Min.	Max.	Source
Terms of trade shock	Logarithm of the relative price of imports weighted by the share of imports in GDP [(M/Y) log (P_M/P_Y)]	-0.05	0.07	-0.23	0.19	Bassanini and Duval (2006)
Total factor productivity shock	Deviation of the logarithm of total factor productivity from its trend. Trend growth rate of total factor productivity calculated using the Hodrick-Prescott filter ($\lambda = 100$)	-0.00	0.02	-0.10	0.05	Bassanini and Duval (2006)
Trade union density	The share of workers affiliated to a trade union	0.40	0.21	0.08	0.84	Bassanini and Duval (2006)
Unemployment benefits duration	Unemployment benefit duration in years	0.65	0.23	0.32	1.64	OECD (various issues, a)
Unemployment benefits replacement rate	Gross unemployment benefits as a share of previous gross wage earnings. Averages across two income situations (100% and 67% of average production worker earnings), three family situations (single, with dependent spouse, with spouse in work) and three different unemployment durations (first year, second and third years, fourth and fifth years of unemployment)	0.30	0.13	0.35	0.65	OECD (various issues, a)
Unemployment rate	Unemployed as a percentage of the civilian labor force (standardized rates)	7.50	3.51	1.73	19.51	OECD (2006, 2007)

Table A1. List of variables (cont.)

	Definition	Mean	Std. Dev.	Min.	Max.	Source
Venture capital availability	Survey responses from the World Economic Forum's annual *Executive Opinion Surveys* (EOS). In each country, approximately 50 senior business executives were questioned (see text for a more detailed description of the surveys). The questions are as follows: 'Availability of risk capital: 1 = not at all available, to 6 = readily available' (EOS 1982); 'Availability of risk capital: 0 = not at all available, to 100 = readily available' (EOS 1983); 'Risk capital: 0 = not at all available, to 100 = very readily available' (EOS 1984, 1986, 1987 & 1989); 'Venture capital: 0 = not at all available, to 100 = readily available' (EOS 1990); 'Venture capital is not readily available for business development (= 0), or is readily available for business development (= 100)' (EOS 1992); 'Venture capital is not readily available for business development (= 0), or is readily available for business development (= 10)' (EOS 1993, 1994 & 1995); 'Venture capital is readily available for business development (1 = strongly disagree; 6 = strongly agree)' (EOS 1996); 'Venture capital is readily available for new business development (1 = strongly disagree; 7 = strongly agree)' (EOS 1997 & 1999); 'Venture capital is readily available for new business and development (1 = strongly disagree; 7 = strongly agree)' (EOS 1998); 'Entrepreneurs with innovative but risky projects can generally find venture capital (1 = strongly disagree; 7 = strongly agree)' (EOS 2000); 'Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1 = not true, 7 = true)' (EOS 2001 & 2002). For the purpose of this paper, the country-level average scores were scaled to take values between 0.1 and 0.7, with higher values indicating that venture capital was more readily available	0.43	0.09	0.20	0.64	European Management Forum (1982), EMF Foundation (1984), EMF Foundation – The World Economic Forum (1985, 1986), World Economic Forum (1987, 1996, 1997, 1998, 1999, 2000, 2002, 2003), World Economic Forum and Institute for Management Development (1989, 1990, 1992, 1993, 1994, 1995)
Wage bargaining centralization or coordination	Dummy variable for a high degree of wage bargaining centralization or coordination	0.56	0.50	0.00	1.00	Bassanini and Duval (2006)

Table A2. Correlation matrix – main explanatory variables[a)]

	Venture capital availability	Private credit	Stock market total value traded	Trade union density	Collective bargaining coverage	Wage bargaining centralization or coordination	Tax wedge	Employment protection legislation	Unemployment benefits replacement rate	Product market regulation	Output gap
Venture capital availability	1.00										
Private credit	0.24***	1.00									
Stock market total value traded	0.44***	0.38***	1.00								
Trade union density	0.08	-0.42***	-0.23***	1.00							
Collective bargaining coverage	-0.28***	-0.46***	-0.32***	0.39***	1.00						
Wage bargaining centralization or coordination	-0.06	0.04	-0.08	0.31***	0.25***	1.00					
Tax wedge	-0.02	-0.28***	-0.13**	0.34***	0.59***	0.02	1.00				
Employment protection legislation	-0.46***	-0.16***	-0.35***	0.09*	0.63***	0.06	0.61***	1.00			
Unemployment benefits replacement rate	0.06	-0.16***	-0.06	0.26***	0.56***	0.36***	0.35***	0.29***	1.00		
Product market regulation	-0.47***	-0.40***	-0.48***	0.16***	0.44***	0.19***	0.34***	0.54***	0.15***	1.00	
Output gap	0.33***	0.18***	0.18***	-0.16***	-0.01	0.11**	-0.13**	-0.04	0.12**	-0.22***	1.00

[a)]***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Table A3. Regressions to explain the unemployment rate – robustness checks[a)]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Financial system deposits substituted for private credit and stock market capitalization substituted for stock market total value traded	Labor & consumption tax rates substituted for tax wedge	Employment protection legislation split into two components	Unemployment benefits replacement rate split into two components	Macroeconomic shocks substituted for output gap	GDP per capita added	Active labor market policies added	Central bank independence added
Venture capital availability	-7.59** (2.87)	-6.05** (2.46)	-4.86* (2.42)	-7.16** (2.54)	-10.69*** (2.94)	-5.38** (2.31)	-5.18*** (1.64)	-6.10** (2.38)
Financial system deposits	-0.46 (0.88)							
Stock market capitalization	0.54 (0.47)							
Labor tax rate		16.92* (9.31)						
Consumption tax rate		-7.89 (19.24)						
Employment protection legislation regular contracts			18.00* (10.01)					
Employment protection legislation temporary contracts			-4.19 (4.75)					
Initial unemployment benefits replacement rate				3.60 (3.16)				
Unemployment benefits duration				-1.07 (1.13)				

Table A3. Regressions to explain the unemployment rate – robustness checks[a)] (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total factor productivity shock					-15.22* (7.50)			
Terms of trade shock					23.21** (8.83)			
Interest rate shock					0.15 (0.09)			
GDP per capita						-0.49** (0.18)		
Active labor market policies							-4.29*** (0.54)	
Central bank independence								-1.78* (1.02)
Central bank independence * wage bargaining centralization or coordination								1.25 (1.52)
Number of observations	247	240	250	250	237	250	250	250
R^2	0.73	0.73	0.76	0.75	0.68	0.76	0.82	0.75
Standard error of regression	1.00	1.01	0.96	0.97	1.10	0.96	0.82	0.98

[a)]Pooled least squares estimates with country-specific and year-specific fixed effects. Unless otherwise noted at the top of the table, each regression additionally includes as control variables 'private credit', 'stock market total value traded', 'trade union density', 'collective bargaining coverage', 'wage bargaining centralization or coordination', 'tax wedge', 'employment protection legislation', 'unemployment benefits replacement rate', 'product market regulation' and 'output gap' (estimates not shown here). The sample consists of 20 industrial countries. The sample period is 1982 to 2003. Except for the variables 'output gap', 'financial system deposits', 'stock market capitalization', 'total factor productivity shock', 'terms of trade shock', 'interest rate shock' and 'GDP per capita', all explanatory variables are lagged by one year. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Table A4. Regressions to explain long-term unemployment – robustness checks[a)]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Financial system deposits substituted for private credit and stock market capitalization substituted for stock market total value traded	Labor & consumption tax rates substituted for tax wedge	Employment protection legislation split into two components	Unemployment benefits replacement rate split into two components	Macroeconomic shocks substituted for output gap	GDP per capita added	Active labor market policies added	Central bank independence added
Venture capital availability	-38.03*** (11.67)	-27.31** (12.15)	-32.24** (11.92)	-35.89*** (11.25)	-27.36*** (9.27)	-24.56** (9.13)	-26.01** (10.33)	-31.40** (13.00)
Financial system deposits	-2.09 (6.58)							
Stock market capitalization	7.30*** (1.74)							
Labor tax rate		109.88** (43.28)						
Consumption tax rate		-6.87 (66.27)						
Employment protection legislation regular contracts			-4.43 (33.11)					
Employment protection legislation temporary contracts			-18.16 (21.75)					
Initial unemployment benefits replacement rate				11.18 (10.49)				
Unemployment benefits duration				-8.64** (3.69)				

Table A4. Regressions to explain long-term unemployment – robustness checks[a)] (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total factor productivity shock					31.67* (18.05)			
Terms of trade shock					127.70*** (24.64)			
Interest rate shock					0.59** (0.23)			
GDP per capita						-2.84*** (0.93)		
Active labor market policies							-18.47*** (3.78)	
Central bank independence								-4.83 (3.67)
Central bank independence * wage bargaining centralization or coordination								4.18 (7.66)
Number of observations	243	239	246	246	233	246	246	246
R^2	0.55	0.50	0.52	0.55	0.65	0.59	0.66	0.53
Standard error of regression	4.50	4.75	4.67	4.52	3.91	4.33	3.95	4.63

[a)]Pooled least squares estimates with country-specific and year-specific fixed effects. Unless otherwise noted at the top of the table, each regression additionally includes as control variables 'private credit', 'stock market total value traded', 'trade union density', 'collective bargaining coverage', 'wage bargaining centralization or coordination', 'tax wedge', 'employment protection legislation', 'unemployment benefits replacement rate', 'product market regulation' and 'output gap' (estimates not shown here). The sample consists of 20 industrial countries. The sample period is 1982 to 2003. Except for the variables 'output gap', 'financial system deposits', 'stock market capitalization', 'total factor productivity shock', 'terms of trade shock', 'interest rate shock' and 'GDP per capita', all explanatory variables are lagged by one year. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Table A5. Regressions to explain the employment rate – robustness checks[a)]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Financial system deposits substituted for private credit and stock market capitalization substituted for stock market total value traded	Labor & consumption tax rates substituted for tax wedge	Employment protection legislation split into two components	Unemployment benefits replacement rate split into two components	Macroeconomic shocks substituted for output gap	GDP per capita added	Active labor market policies added	Central bank independence added
Venture capital availability	11.78** (4.57)	8.80** (4.00)	7.25* (3.58)	10.50** (4.16)	10.47*** (2.76)	7.34** (3.40)	6.88*** (2.11)	9.29** (4.02)
Financial system deposits	2.85 (1.85)							
Stock market capitalization	-1.21* (0.67)							
Labor tax rate		-51.23*** (12.91)						
Consumption tax rate		22.48 (32.70)						
Employment protection legislation regular contracts			-22.05 (17.50)					
Employment protection legislation temporary contracts			9.92 (8.96)					
Initial unemployment benefits replacement rate				1.44 (6.00)				
Unemployment benefits duration				1.97 (1.95)				

Table A5. Regressions to explain the employment rate – robustness checks[a)] (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total factor productivity shock					-4.91 (9.08)			
Terms of trade shock					-41.74*** (11.94)			
Interest rate shock					-0.23* (0.11)			
GDP per capita						0.91*** (0.29)		
Active labor market policies							8.23*** (1.30)	
Central bank independence								2.36 (1.50)
Central bank independence * wage bargaining centralization or coordination								1.73 (3.00)
Number of observations	246	239	249	249	236	249	249	249
R^2	0.61	0.68	0.63	0.60	0.67	0.65	0.78	0.63
Standard error of regression	1.57	1.47	1.57	1.62	1.45	1.53	1.19	1.57

[a)]Pooled least squares estimates with country-specific and year-specific fixed effects. Unless otherwise noted at the top of the table, each regression additionally includes as control variables 'private credit', 'stock market total value traded', 'trade union density', 'collective bargaining coverage', 'wage bargaining centralization or coordination', 'tax wedge', 'employment protection legislation', 'unemployment benefits replacement rate', 'product market regulation' and 'output gap' (estimates not shown here). The sample consists of 20 industrial countries. The sample period is 1982 to 2003. Except for the variables 'output gap', 'financial system deposits', 'stock market capitalization', 'total factor productivity shock', 'terms of trade shock', 'interest rate shock' and 'GDP per capita', all explanatory variables are lagged by one year. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.

Table A6. Coefficient on 'venture capital availability' when excluding one country at a time[a)]

Country excluded	Dependent variable		
	Unemployment rate	Long-term unemployment	Employment rate
Australia	-6.06**	-33.14**	9.34**
	(2.51)	(12.47)	(4.20)
Austria	-7.07**	-35.41***	10.59**
	(2.57)	(11.67)	(4.14)
Belgium	-6.98**	-34.70**	10.90**
	(2.63)	(12.49)	(4.31)
Canada	-6.78**	-34.34**	10.83**
	(2.57)	(12.40)	(4.39)
Denmark	-7.99***	-36.22***	10.61**
	(2.39)	(12.14)	(4.62)
Finland	-6.64**	-37.61***	10.46**
	(2.62)	(11.47)	(4.29)
France	-6.99**	-32.88**	10.12**
	(2.57)	(12.18)	(4.31)
Germany	-7.10**	-33.82**	10.34**
	(2.77)	(13.34)	(4.71)
Ireland	-6.96**	-35.27***	10.63**
	(2.46)	(11.94)	(4.10)
Italy	-6.32**	-37.16***	10.10**
	(2.56)	(10.93)	(4.36)
Japan	-7.51**	-33.29**	12.37**
	(2.78)	(12.39)	(4.54)
Netherlands	-7.57***	-40.72***	11.59***
	(2.57)	(8.72)	(3.72)
New Zealand	-7.42**	-32.37**	10.47**
	(2.58)	(12.52)	(4.24)
Norway	-8.16***	-23.80**	9.92*
	(2.51)	(11.26)	(4.77)
Portugal	-6.51**	-31.67**	10.23**
	(2.47)	(12.01)	(4.18)
Spain	-6.37**	-31.27**	8.64**
	(2.34)	(13.45)	(3.58)
Sweden	-4.69**	-27.55**	5.82**
	(1.62)	(12.39)	(2.18)
Switzerland	-6.40**	-30.93**	9.93**
	(2.43)	(12.10)	(3.98)
United Kingdom	-6.77**	-35.11**	10.61**
	(2.59)	(12.85)	(4.47)
United States	-6.70**	-32.54**	10.29**
	(2.57)	(12.66)	(4.31)

Table A6. Coefficient on 'venture capital availability' when excluding one country at a time[a)] (cont.)

[a)]Results from pooled least squares regressions with country-specific and year-specific fixed effects. Each estimate shown is from a separate multivariate regression. The control variables used (estimates not shown here) are the same as the ones for the baseline specifications (Table 1), i.e., 'private credit', 'stock market total value traded', 'trade union density', 'collective bargaining coverage', 'wage bargaining centralization or coordination', 'tax wedge', 'employment protection legislation', 'unemployment benefits replacement rate', 'product market regulation' and 'output gap'. The full sample consists of 20 industrial countries. The sample period is 1982 to 2003. Except for the 'output gap' variable, all explanatory variables are lagged by one year. Robust standard errors, adjusted for clusters at the country level, are reported in parentheses. ***(**/*) denotes statistically significant at the 1%(5%/10%) level.